IN THE UNITED STATES PATENT AND TRADEMARK OFFICE BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Application No.: 10/657,005

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Applicant: Ronald N. Caron

Group Art: 1742

Examiner: Sikyin Ip

Title: Age-Hardening Copper-Base Alloy And Processing

Attorney Docket: 6113B-000026/US

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REPLY BRIEF

Sir:

In response to the Examiner's Answer of August 7, 2007, Applicant submits the following reply brief:

The Examiner's Answer states on page 6 that JP 2001181759 discloses an alloy No. 10 that does not contain Titanium and still meets the Applicant's claimed tensile strength and electrical conductivity, thus indicating that Titanium is not essential to obtain the claimed tensile property and electrical conductivity.

However, while the claimed properties may be present in other alloys that do not contain Titanium, such alloys are not the subject of the present claims on appeal. The present claims relate to Copper alloys that contain Titanium and possess a high yield strength and conductivity. The Appellant maintains that the references cited in the Final Office Action do not teach or suggest an alloy having the Appellant's claimed amount of Titanium, or the clamed alloy properties.

As the Federal Circuit noted, an Applicant/Appellant can rebut a *prima facie* case of obviousness based on overlapping ranges by showing that the claimed range achieves unexpected results relative to the prior art." *In re Woodruff*, 919 F.2d 1575, 16 USPQ2d 1934 (Fed. Cir. 1990); MPEP 2144.05. Here, the present application discloses numerous Copper-Titanium alloy compositions having an amount of Titanium in the claimed range, which alloys achieved a conductivity of at least 50% IACS and a yield strength of at least 105 KSI, when made according to Appellant's process (see Alloys J345, J347, and J348 in Table 3, for example). These alloys having an amount of Titanium within the claimed range achieved unexpected conductivity and yield strength properties, when compared to Copper-Titanium alloys as in the cited references/prior art.

Specifically, Applicant respectfully submits that JP2001181759 fails to disclose or suggest a copper-titanium alloy having the claimed Titanium content, or any Copper-Titanium alloy possessing the claimed electrical and physical properties. While JP2001181759 indicates that Titanium can be included, it fails to disclose a Titanium containing alloy that meets the requirements of the claims. The only specific copper-titanium alloy that Appellants find in the translated specification is Example 7, which has a Ti content of just 0.1, below the minimum of the claimed range of 0.35. Furthermore, Example 7 has a stated yield strength of 678 N/mm^2 which according to Appellant's calculations is 98.3 ksi, significantly below the required "at least 105 ksi". Even if JP2001181759 does disclose an alloy containing Titanium, such an alloy would not inherently possess the same properties if made by a process other than Appellant's. The Appellant notes that alloys having similar structures do not necessarily possess the same properties or characteristics, where the alloys are formed by different processes.

To illustrate this point, the Appellant notes that the presently disclosed Copper alloy J347 (consisting of 0.80% Chromium and 0.80 Titanium) would not possess the claimed property of an electrical conductivity of at least 50% AICS, if the alloy were only in a Cold Rolled and Annealed condition without a second age annealing at 525° C for 3 hours. (see Alloy J347 in Table 3, in ¶ [0073] of the present application). However, the same J347 Copper alloy composition would possess the characteristics and properties of the claimed invention, when following the Applicant's process including a second age annealing at 525° C for 3 hours followed by cold rolling and relief anneal at 275° C for 2 hours. (compare Alloy J347 in Table 2 in ¶ [0073], versus Table 3 in ¶ [0075] of the present application). Accordingly, alloys having the same composition do not necessarily possess the same properties, where the alloys are processed differently.

Absent the disclosure of a Copper alloy made according to the Appellant's process to yield an alloy having the claimed properties, or the disclosure of a similar alloy made to have the claimed properties, JP2001181759 does not necessarily possess the characteristic of an alloy having an electrical conductivity of at least 50% AICS and a yield strength of at least 105 KSI. As such, the Appellant submits that JP2001181759 does teach or suggest an alloy having a Titanium content in the claimed range, and the claimed properties. The Appellants also submit that it is not obvious to process a Copper alloy including a Titanium content in the claimed range, such that the alloy would possess the claimed properties. As such, the Appellant submits that the alloy of claim 1 having the recited properties is not obvious in view of JP2001181759.

Contrary to the alloys in the cited references, the alloy J347 of the present application having a 0.80% Titanium content achieved a yield strength of at least 105 ksi,

and an electrical conductivity of 49.9% of the electrical conductivity of unalloyed copper (IACS), when cold-rolled and age annealed at 525° Celsius for three hours, and subsequently using a second cold-rolled step and a second age anneal at 525° Celsius for another three hours. (See Alloy ID J347 in Table 3 of the present application as published in 20040166017). These unexpected results are not simply the Appellant's belief, but are clearly established by the above factual evidence of a Copper-Titanium alloy having a yield strength of at least 105 ksi, and an electrical conductivity of 49.9% of the electrical conductivity of unalloyed copper (IACS).

The Examiner's Answer states on page 6 that comparison must be done under identical conditions except for the novel feature of the invention. The Appellant notes that the present application claims a process "capable of making the alloy of this invention with nominal properties of about 110 ksi Yield Strength and about 50% IACS conductivity". (See ¶ [0068] of the present application). The Appellant further notes that the present application does makes a comparison of alloy samples like J347, with and without the second age annealing at 525° C for 3 hours, cold rolling and subsequent relief anneal at 275° C for 2 hours. Accordingly, the Appellant has made a comparison under identical conditions that notes the alloys subjected to second age annealing had a combination of a high yield strength, but with higher electrical conductivity of between 49.9% IACS and 69.7% IACS. (See ¶ [0075] of the present application).

Contrary to Applicant's explicit disclosure, JP 2002038246 recites a Copper alloy in which a remainder consists of Copper and an unescapable impurity including: Sn: 0-10%wt, Zn: 0-40wt%, Nickel: 0-10 wt%, Fe: 0-3 wt%, Cr: 0-1 wt%, Mn: 0-1 wt%, P: 0-0.5 wt%, Si: 0-1 wt%, Mg: 0-1 wt%, Zn: 0-0.5 wt%, Ti: 0-1 wt% Co: 0-1 wt%, Ag:0-1

wt%, Aluminum 0-5 wt%. This laundry list of possible impurities is so broad, there is no finite number of possible predictable solutions that a person or ordinary skill would have considered "obvious to try". The extensive list of elements encompasses a very large number of possible combinations, which only invites further experimentation to find a species with the Appellant's claimed range of Titanium that will result in the unexpected result of an alloy having the claimed an improved combination of yield strength and electrical conductivity.

Likewise, JP 092363864 recites (in claim 2) a copper alloy that contains 0.1-1.0 wt % Si, and a total amount of 0.01 to 6.0 wt. % of at least one or more of the following: Mg: 0.01-1.0%wt, Al: 0.01-1.0wt%, Ti: 0.01-1.0wt%, Cr: 0.01-1.5wt%, Mn: 0.01-1.0wt%, Fe: 0.01-3.0wt%, Co: 0.01-3.0wt%, Ni: 0.01-4.0wt%, Zn: 0.01-5.0wt%, Zr: 0.01-1.0wt%, Ag: 0.01-1.0wt%, and Sn: 0.01-2.0wt%. Accordingly, JP 092363864 also discloses a large number of possible combinations, without any mention whatsoever of a Titanium content required to achieve an improved combination of yield strength and electrical conductivity, such as a yield strength of at least 105 KSI, and an electrical conductivity of 49.9% of IACS achieved in Alloy J347, for example.

Given that the numerous recited elements and broad range of amounts in the cited references, there is no finite number of possible predictable solutions that a person or ordinary skill would have considered "obvious to try". Rather, the broad number of possible combinations only invites further experimentation to find the Appellant's claimed range of Titanium. Thus, a person of ordinary skill in the art considering JP 2002038246 or JP 092363864 would not have found it "obvious to try" an alloy having the Titanium content of the claimed alloy composition.

Conclusion

There is no teaching or suggestion in the cited references regarding the claimed amount of Titanium, much less a Copper alloy having the claimed range of Titanium and the unexpected results of the claimed properties. As such, the claims are not obvious in view of the references or the Examiner's Answer. For the foregoing reasons, applicants submit that the rejection of the claims should be reversed for the reasons set forth in Applicants' Brief on Appeal and in this Reply Brief.

Respectfully submitted,

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CERTIFICATE OF MAILING

I certify that on 9-7-2007, APPLICANTS' REPLY BRIEF was filed electronically with the U.S. Patent and Trademark Office.

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